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EXAMINER	
AMINI, JAVID A	

ART UNIT	PAPER NUMBER
2672	9

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/854,119	TRAJKOVIC, MIROSLAV	
	Examiner	Art Unit	
	Javid A Amini	2672	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-20 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Response to Arguments

Applicant's arguments filed February 21, 2004 have been fully considered but they are not persuasive.

Applicant on page 7 lines 12-31 argues that the reference Frazier does not establish prima facie obviousness of the claimed invention, because the reference is performed to enhance edges within a single image and not to align different images. Examiner's reply: in view of whole claim 1 's language do not specify clearly the nature of first and second images (static or dynamic or combination), and also do not specify the distinguish between the two images, except the different resolutions, that the reference clearly illustrates in figs. 4b and 4c. the first image with low resolution and the second image with higher resolution. Frazier in col. 1 lines 10-21 teaches that the invention relates to image processing and recognition systems. More specifically, the invention relates to license plate locators and readers. While the invention is described herein with reference to illustrative embodiments for particular applications, it should be understood that the invention is not limited thereto. Those having ordinary skill in the art and access to the teachings provided herein will recognize additional modifications, applications, and embodiments within the scope thereof and additional fields in which the present invention would be of significant utility. Frazier in col. 2, lines 31-37, teaches explicitly edge enhancement and shadow reduction (considered as an aligning) are achieved by applying a Laplacian operator on the input image. Performance is further improved by filtering out distracting edges within the resulting correlation surface and then locating the highest peaks within this filtered correlation surface. The location of the highest peaks provides the location of the plate.

- Applicant on page 2 lines 8-18 argues that the reference Gupta 121 does not discloses or suggests the RANSAC algorithm. Examiner's reply: As mentioned on previous office action, the step of RANSAC algorithms is well known in the art, (the structure of the RANSAC algorithm is simple but powerful. Repeatedly, subsets are randomly selected from the input data and model parameters fitting the sample are computed. The size of the random samples is the smallest sufficient for determining model parameters). The reference Gupta 121 in col. 4 lines 19-46 discloses a method of correlation (matching techniques). And the reference Frazier teaches a method of applying a Laplacian operator on the input image data. Therefore the outcome of present invention using RANSAC algorithms would be obvious to the prior arts.
- Applicant on page 9 regarding claim 5 argues that Gupta 121 does not disclose or suggest for determining a rotation component and translation component in image space. Examiner's reply: See Gupta 121 in cols. 3-4 lines 63-67 and 1-6 teaches the image tiles in the mask and the opacified images may be rotated or translated with respect to each other. The mismatch arising because of such rotation is corrected by a two-dimensional perspective transformation of the mask image tile to the neighborhood of its corresponding tile in the opacified image based, on user-provided rough match points. The method described in Gupta-Srinivas, "Image Warping for Accurate Digital Subtraction Angiography", Proc. of AAAI, Spring Symposium on Applications of Computer Vision in Medical Image Processing, Stanford University, March 21-23, 1994, may be used.

- Applicant on page 10 lines 1-6 argues that references do not teach the homographic matrix. Examiner's reply: the method homographic matrix is well known in the art, and the references are using correlation method (matching techniques). Frazier in figs. 5a-c illustrates long horizontal edges are suppressed to reduce false peaks that can occur in portions of the scene (such as in grooves along bumpers) that contain spatial frequencies matching those found in plate characters along the vertical direction (e.g. the vertical spacing of the grooves match the height of the characters) but not along the horizontal direction (i.e. these areas of horizontal grooves contain no vertical lines whose spacing matches the width of the characters). Gupta 121 in col. 4, lines 47-59 teaches that The method, moreover, is not limited to the specific implementation described above. For example, other hierarchical matching techniques, such as those described by Quam, "Hierarchical Warp Stereo", in M. A. Fischler and O. Firschein, editors, Readings In Computer Vision, pgs. 80-86, Morgan Kaufmann Publishers, Inc., 1987, can be used in match point generation. While a correlation-based matching scheme is described above, a feature-based matching scheme could alternatively be used.
- Applicant on page 10 lines 7-10 argues that the references do not disclose or suggest for identifying corners in the images based on intensity changes at that location. Examiner's reply: Gupta 121 in col. 4, lines 41-46 teaches the limitation of claim 8 as the intensity of each pixel in the image. Each pixel in the mask image is then log-subtracted from its corresponding pixel in the opacified image.
- Applicant arguments on pages 10-12 have been countered in the above paragraphs.
- The rejection of 35 U.S.C. 112 second paragraphs has been withdrawn.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-20 rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta et. al. with US patent number 5,848,121 and further in view of Frazier et al. (hereinafter referred as a Frazier).

1. Claim 1.

Gupta in col. 2, lines 23-30 teaches the step of "A method of aligning a first image (as a mask image) to a second image (as a opacified image), comprising:" Gupta in col. 1, lines 58-67 teaches the step of "determining a first alignment approximation, based on distances (see Gupta in col. 4, lines 41-46) between one or more points in the first image and the second image, Gupta in Fig. 2 step 56 illustrates starting with lowest resolution image that teaches the step of "with the first and second images at a first resolution, see Gupta in Fig. 2, steps 58 and 60 that teaches the step of "aligning the second image to the first image, based on the first alignment approximation, to form an initially aligned second image, determining a second alignment approximation, based on distances between one or more points in the first image and the initially aligned second image, Gupta in col. 3, lines 53-62 teaches the step of "with the first and second images at a second resolution different from the first resolution", See Gupta in Fig. 2 steps 60 and 62 for the following step "aligning the second image to the first image, based on a combination of the first and second alignment approximation", but Gupta does not explicitly

specify a combination of the first and second alignment. However, Frazier et al. in Figs. 4b and 4c illustrates a combination of the first and second alignment applying a Laplacian operator. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Frazier et al. into Gupta in order to improve performance by helping to distinguish between similar characters (such as between the characters `B`and `8`). The advantages of this modification are less cost and save more storage space.

2. Claim 2.

Gupta in col. 2, lines 31-46 teaches the step of "The method of claim 1, wherein aligning the second image to the first image based on the combination of the first and second alignment approximations is effected by: aligning the initially aligned second image, which is based on the first alignment approximation, to the first image, based on the second alignment approximation", but Gupta does not explicitly specify a combination of the first and second alignment. However, Frazier et al. in Figs. 4b and 4c illustrates a combination of the first and second alignment applying a Laplacian operator.

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Frazier et al. into Gupta in order to improve performance by helping to distinguish between similar characters (such as between the characters `B`and `8`). The advantages of this modification are less cost and save more storage space.

3. Claim 3.

Gupta in Fig. 2 teaches the step of starting with lowest resolution, and this considers as a first resolution. "Determining the first alignment approximation is based on the first resolution being a low-resolution representation of the first and second images, Gupta in Fig. 2 step 58 illustrates

that matches interesting points in mask image (first image) with corresponding points in opacified image (second image),"determining the second alignment approximation is based on the second resolution being a higher-resolution representation of the first and second images".

4. Claim 4.

Gupta in col. 2, lines 31-46 teaches the step of "The method of claim 1, wherein determining at least one of the first alignment and second alignment approximations includes applying the RANSAC algorithm", by cross-correlating the sample data between images. The step of RANSAC algorithms is well known in the art, (the structure of the RANSAC algorithm is simple but powerful. Repeatedly, subsets are randomly selected from the input data and model parameters fitting the sample are computed. The size of the random samples is the smallest sufficient for determining model parameters.). However applicant fails to illustrate the calculations, variables and interpretation of data in detail.

5. Claim 5.

Gupta in col. 3, lines 63-67, teaches the step of "The method of claim 1, wherein determining the first alignment approximation includes an approximation of at least one of a rotation component and a translation component in an image space of the first and second images". However, Frazier et al. in Figs. 4b and 4c illustrates a combination of the first and second alignment applying a Laplacian operator.

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Frazier et al. into Gupta in order to improve performance by helping to distinguish between similar characters (such as between the characters `B`and `8`). The advantages of this modification are less cost and save more storage space.

6. Claim 6.

"The method of claim 5, wherein determining the second alignment approximation includes an approximation of components of a 3x3 homographic matrix", the method homographic matrix is well known in the art, and the references are using correlation method (matching techniques). Frazier in figs. 5a-c illustrates long horizontal edges are suppressed to reduce false peaks that can occur in portions of the scene (such as in grooves along bumpers) that contain spatial frequencies matching those found in plate characters along the vertical direction (e.g. the vertical spacing of the grooves match the height of the characters) but not along the horizontal direction (i.e. these areas of horizontal grooves contain no vertical lines whose spacing matches the width of the characters). Gupta 121 in col. 4, lines 47-59 teaches that The method, moreover, is not limited to the specific implementation described above. For example, other hierarchical matching techniques, such as those described by Quam, "Hierarchical Warp Stereo", in M. A. Fischler and O. Firschein, editors, Readings In Computer Vision, pgs. 80-86, Morgan Kaufmann Publishers, Inc., 1987, can be used in match point generation. While a correlation-based matching scheme is described above, a feature-based matching scheme could alternatively be used.

7. Claim 7.

See rejection of claim 6, "The method of claim 1, wherein determining the second alignment approximation includes an approximation of components of a 3x3 homographic matrix".

8. Claim 8.

Gupta in col. 3, lines 44-51 teaches the step of "The method of claim 1, wherein determining at least one of the first and second alignment approximations includes identifying corners in the

first and second images based on a determination of Minimum Intensity Changes at the corners", but does not explicitly specify corners in the first and second images. However, Frazier et al. in Figs. 4b and 4c illustrates a combination of the first and second alignment applying a Laplacian operator.

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Frazier et al. into Gupta in order to improve performance by helping to distinguish between similar characters (such as between the characters `B`and `8`). The advantages of this modification are less cost and save more storage space.

9. Claim 9.

Gupta in col. 2, lines 23-30 teaches the step of "A method of tracking an object based on a first image and a second image, comprising: Gupta in col. 1, lines 58-67 teaches the step of "aligning the first and second images to form a set of aligned images, and detecting motion by comparing the set of aligned images, wherein aligning the first and second images includes: determining a first alignment approximation, based on distances (see Gupta in col. 4, lines 41-46) between one or more points in the first image and the second image, Gupta in Fig. 2 step 56 illustrates starting with lowest resolution image that teaches the step of "with the first and second images at a first resolution, aligning the second image to the first image, based on the first alignment approximation, to form an initially aligned second image, determining a second alignment approximation, based on distances between one or more points in the first image and the initially aligned second image, Gupta in col. 3, lines 53-62 teaches the step of "with the first and second images at a second resolution different from the first resolution, See Gupta in Fig. 2 steps 60 and 62 for the following step "aligning the second image to the first image, based on a

combination of the first and second alignment approximations". But Gupta does not explicitly specify a combination of the first and second alignment. However, Frazier et al. in Figs. 4b and 4c illustrates a combination of the first and second alignment applying a Laplacian operator. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Frazier et al. into Gupta in order to improve performance by helping to distinguish between similar characters (such as between the characters `B`and `8`). The advantages of this modification are less cost and save more storage space.

10. Claim 10.

Gupta in col. 2, lines 31-46 teaches the step of "The method of claim 9, wherein determining the first alignment approximation is based on a low-resolution representation of the first and second images, and determining the second alignment approximation is based on a higher-resolution representation of the first and second images".

11. Claim 11.

"The method of claim 9, further including identifying the object in the set of aligned images based on color matching", Gupta teaches colors that are between the low and high resolutions image, the colors than can be seen usually in X-ray images are gray, black, white.

12. Claim 12.

"The method of claim 9, further including determining a location of the object in each image of the set of aligned images, and determining a movement of the object by comparing the location of the object in each image", Gupta does not explicitly specify a movement of the object, However, Frazier et al. in Figs. 4b and 4c illustrates a combination of the first and second alignment applying a Laplacian operator.

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Frazier et al. into Gupta in order to improve performance by helping to distinguish between similar characters (such as between the characters `B`and `8`). The advantages of this modification are less cost and save more storage space.

13. Claim 13.

Gupta in col. 1, lines 31-37 teaches the step of "A motion detecting system comprising: Gupta in col. 2, lines 59-64 teaches the step of "a processor that is configured to: Gupta in col. 1, lines 58-67 teaches the step of "align a first image and a second image, to form a set of aligned images, by: determining a first alignment approximation, based on distances (see Gupta in col. 4, lines 41-46) between one or more points in the first image and the second image, aligning the second image to the first image, based on the first alignment approximation, to form an initially aligned second image, Gupta in Fig. 2 step 56 illustrates "determining a second alignment approximation, based on distances between one or more points in the first image and the initially aligned second image, Gupta in col. 3, lines 53-62 teaches the step of "aligning the second image to the first image, based on a combination of the first and second alignment approximations; See Gupta in Fig. 2 steps 60 and 62 for the following step "compare the set of aligned images to identify motion of objects within the first and second images". But Gupta does not explicitly specify a combination of the first and second alignment. However, Frazier et al. in Figs. 4b and 4c illustrates a combination of the first and second alignment applying a Laplacian operator.

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Frazier et al. into Gupta in order to improve performance by

helping to distinguish between similar characters (such as between the characters `B`and `8`). The advantages of this modification are less cost and save more storage space.

14. Claim 14.

Gupta in Fig. 2 step 56 illustrates starting with lowest resolution image that teaches the step of " "The motion detecting system of claim 13, wherein the processor is configured to: determine the first alignment approximation by processing a low-resolution representation of at least one of the first and second images, and determine the second alignment approximation by processing a higher-resolution representation of the first and second images".

15. Claim 15.

Gupta in col. 1, lines 39-48 teaches the step of "The motion detecting system of claim 13, further including at least one camera for producing the first and second images". Frazier in figs. 4b and 4c illustrates an image of a license plate that produced by a motion detecting system (camera with speed detection).

16. Claim 16.

The step of "The motion detecting system of claim 13, further including a memory for storing a representation of a target image, and wherein the processor is further configured to identify a target within the set of aligned images, based on the representation of the target image", is obvious, because the system must have a memory for storing a representation of a target image.

17. Claim 17.

"The motion detecting system of claim 16, wherein the representation of the target image is a characterization based on color content of the target image", Gupta teaches colors that are

between the low and high resolutions image, the colors than can be seen usuallyin X-ray images are gray, black, white.

18. Claim 18.

"The motion detecting system of claim 13, further including determining a location of an object in each image of the set of aligned images, and determining a movement of the object by comparing the location of the object in each image", Gupta does not explicitly specify a movement of the object, However, Frazier et al. in Figs. 4b and 4c illustrates a combination of the first and second alignment applying a Laplacian operator.

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Frazier et al. into Gupta in order to improve performance by helping to distinguish between similar characters (such as between the characters `B`and `8`). The advantages of this modification are less cost and save more storage space.

19. Claim 19.

Gupta in col. 3, lines 63-67, teaches the step of "The motion detecting system of claim 13, wherein determining the first alignment approximation includes an approximation of at least one of a rotation component and a translation component".

20. Claim 20.

"The motion detecting system of claim 19, wherein determining the second alignment approximation includes an approximation of components of a 3x3 homographic matrix", Gupta in col. 4, lines 25-30 teaches a 2x2 matrix. Since the components of a matrix (2x2, 3x3, 4x4,....XxX) are well known in the art, it does not matter as claim language. Applicant fails to represent the data value of a 3x3 matrix.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Javid A Amini whose telephone number is 703-605-4248. The examiner can normally be reached on 8-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi can be reached on 703-305-4713. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Javid A Amini
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Javid Amini

JEFFERY BRIER
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